6. A microstrip transmission line of characteristic impedance 50 ohms is designed to be of width W_1 on a dielectric substrate of thickness 'h' and dielectric constant ε_r. At the same frequency, if a transmission line of 100Ω characteristic impedance needs to designed on the same substrate, its width will be

   a) same as W_1
   b) Lesser than W_1
   c) greater than W_1
   d) twice W_1

7. Energy stored in an inductor in terms of standard electrical terminology is

   a) ½ VL
   b) 2 CV
   c) ½ LI^2
   d) ½ LV^2

8. In an amplifier its intercept point is
   a) lower than 1 dB compression point
   b) Same as 1 dB compression point
   c) Higher then 1 dB compression point
   d) None of the above

9. Microwave circulators use the property of magnetic resonance of the ferrite, which depends on its permeability. Permeability is a function of

   a) magnetization and applied static magnetic field
   b) Frequency and Polarization of electromagnetic wave
   c) All of the above
   d) None of the above

10. At a perfectly conducting boundary, the boundary conditions on the field vectors may be specified in standard electromagnetic terminology as

   a) $\nabla \times H = J_s$
   b) $n \times E = J_s$

11. Time average complex power flow across a surface S is given by the integral of the complex poynting vector over that surface. This is represented correctly as

a) $P = \frac{1}{2} \iint_S E \times H^* \, da$

b) $P = \frac{1}{2} \iint_S E^* . H \, da$

c) $P = \frac{1}{2} \iint_S E . H^* \, da$

d) none of the above

where E and H are the electric and magnetic fields.

12. Writing a sequence of control instructions that decode and execute the instructions of some other computer is called as

a) Simulation
b) Emulation
c) Macro programming
d) Micro programming

13. Static hazards are produced in gates as a result of

a) specific function of gate
b) propagation delay of the gate
c) asymmetric path delays through the gate
d) symmetric path delays through the gate

14. n-input, 2^n-output combinational logic device is known as:

a) Multiplexer
b) De multiplexer
c) Minterm Code generator
d) Parity Generator

15. The low noise margin level (NML) for a digital system is given by

a) V_{OL} (max) – V_{IL} (max)

b) V_{IL} (max) – V_{OL} (max)

c) V_{OH} (min) – V_{IH} (min)

d) V_{IH} (min) – V_{IL} (min)

Where V_{OL} = Output Voltage for Low output
V_{IL} = Input Voltage for Low Input
V_{IH} = Input Voltage for High Input
V_{OH}= Output Voltage for High Output

16. A useful figure of merit for a switching device is

a) power delay product
b) the beta value
c) the propagation delay
d) the drain-source resistance value.

17. In VHDL a structural model is declared using

a) Component b) entity
c) package d) Port

18. One time programmable technology is of the type

a) Poly diffusion dielectric or metal sandwich
b) Floating gate avalanche MOS
c) Floating gate tunnel oxide
d) Bipolar complementary MOS

19. A flip-flop is

a) one-bit memory
b) a sequential circuit
c) asynchronous Finite State Machine without timing control input
d) Memory element for synchronous Finite State Machine

20. For temporary data storage and bit manipulation uses, the best preffered choice of device is

a) Multi-mode counter
b) Ripple Counter
c) Shift Register
d) Flip-flop edge triggered

21. Ring Counters are special purpose synchronous counters, that are

a) known as Johnson or Moebius Counter
b) Standard or twisted ring type
c) Both (a) and (b) above
d) None of the above

22. Multi-mode counter is

a) synchronous sequential circuit whose counting sequence can be altered by external control.
b) synchronous sequential circuit whose counting sequence cannot be altered.
c) a specialized Up counter with external clear signal
d) a specialized Down Counter with external load and clear signals.

23. In Mealy machine, the output is

a) strictly a function of the state of the machine.
b) A function of the present input conditions and the present state of machine
c) a function of present input conditions.
d) Some are conditional on both inputs and state of the Machine and other depend only on the state of the machine.

24. Multi-level logic minimization is

a) minimization of gate count, excluding gate path delays.
b) Minimization of gate count including gate path delays.
c) Minimization of IC count.
d) Minimization by using both K-map and EV method.

25. Entered Variable (EV) mapping is

a) new name for normal K-map minimization procedure
b) minimization procedure not based on K-map.
c) Function reduction process based on reduced order K-map that does not guarantee absolute minimum function.
d) Another name for Quine-McClusky (Q-M) tabular reduction method.

26. Two terms are logically adjacent if they differ only in the

a) Complement orientation of a single variable
b) Orientation of more than one variable
c) Complement orientation of more than one variable
d) Inputs are irrelevant

27. In CDMA technique, various channels

a) share the frequency
b) use different time slots
c) use different frequency bands
d) use different antenna orientation

28. A regenerative repeater for Data signal consists of

a) Data Receiver
b) Data Transmitter
c) Both Receiver & Transmitter
d) None of the above

29. An RS 232C is a

a) System Concept
b) Form of Modulation
c) Grade of Coaxial Cable
d) Physical layer interface standard

30. Which of the following gives maximum probability error in conventional communication channel ?

a) ASK
b) FSK
c) PSK
d) DPSK

31. A given source will have maximum entropy if the messages produced are

a) two in number
b) mututally exclusive
c) statistically independent
d) equiprobable

32. In a Delta Modulation system, the granular noise occurs when modulating signal

a) increases rapidly
b) decreases rapidly
c) changes within the step size
d) has high frequency component

33. Pulse stuffing is used in

a) synchronous TDM
b) asynchronous TDM
c) any TDM
d) none of the above

34. In PCM, the quantization noise depends on

a) sampling rate
b) number of quantization levels
c) signal power
d) none of the above

35. The PAM signal can be detected by

a) Bandpass filter
b) Bandstop filter
c) High pass filter
d) Low pass filter

36. The main advantage of TDM over FDM in conventional systems is that it

a) needs less power
b) needs less bandwidth
c) needs simple circuitry
d) gives better S/N ratio

37. The maximum permissible distance between two samples of a 2 KHz Signal for compliance of Nyquist criteria is

a) 1000 μ sec
b) 500 μ sec
c) 250 μ sec
d) none of the above

38. The resonant frequency of an RF amplifier is 1 MHz and its bandwidth is 10 KHz. The Q factor will be

a) 10
b) 100
c) 0.01
d) 0.1

39. Figure of merit in the context of comparison of modulation schemes is always unity in

a) SSB-SC
b) AM
c) FM
d) All the three

40. Limiter is not essential in the following detector

a) Foster Seely
b) balanced slope
c) ratio
d) none

41. Armstrong FM Transmitter performs frequency multiplication in stages

a) to increase the overall S/N ratio
b) to reduce bandwidth
c) to find the desired value of carrier frequency as well as frequency deviation.
d) for convenience

42. The spectrum of the white noise and an impulse function is similar in following respects

a) Both have similar magnitude spectrum
b) Both have similar phase spectrum
c) Both have similar magnitude and phase spectrum
d) They have nothing similar

43. Johnson noise is

a) always white
b) white for all practical purposes
c) never white
d) depends on temperature

44. Events A and B are statistically independent if

a) A and B occur simultaneously
b) A and B occur at different times
c) Occurrence of A includes occurrence of B
d) None of the above

45. The stationary process has

a) ensemble average equal to time average
b) all the statistical properties dependent on time
c) all the statistical properties independent of time
d) zero variance

46. The spectral density of white noise

a) Varies with frequency
b) Varies with bandwidth
c) Varies with amplitude of the signal
d) Is constant

47. The total area under the probability distribution curve is

a) 1
b) 0
c) Depends on the nature of the distribution
d) None of the above

48. Pick the odd one out

a) Binomial distribution
b) Normal distribution
c) Uniform distribution
d) Raleigh distribution

49. A rectangle pulse is passed through an ideal LPF. The output is a

a) triangular function
b) trapezoidal function
c) sampling function
d) none of the above

50. Let $f_1(x) = G_1(x) + 3$; $f_2(x) = G_2(x) + 2$. If $G_1(x)$ and $G_2(x)$ are uncorrelated, correlation between $f_1(x)$ and $f_2(x)$ is,

a) 5
b) 6
c) 1
d) zero

51. Let function $A = \sin\omega_o t$ and $B = \sin(\omega_o t + \varphi)$. The power of these two signals P_A and P_B is related as

a) $P_B = \varphi P_A$
b) $P_B = 1/\varphi\, P_A$
c) $P_B = \tan\varphi\, P_A$
d) $P_B = P_A$

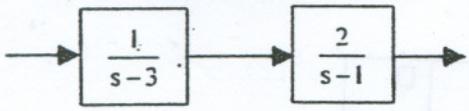
52. SAR is the abbreviation used for

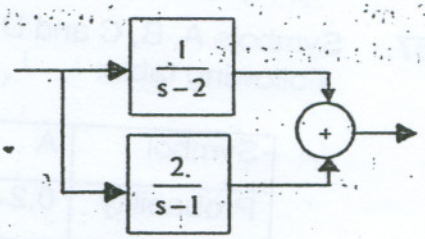
a) Special Application Radar
b) Standard Aperture Radar
c) Synthetic Aperture Radar
d) Slaved Add-on Radar

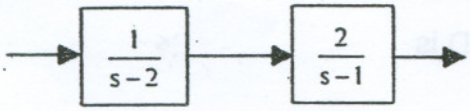
53. The Standard Architecture used in DSP processors is known as

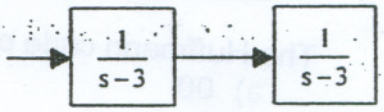
a) Von Neumann Architecture
b) AT&T Architecture
c) Harvard Architecture
d) CCITT Architecture

54. The transfer function $H(S)=\frac{3s-5}{s^2-3s+2}$ represents which one of the following systems.

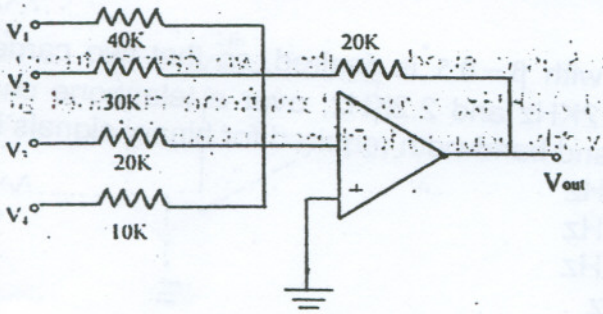
a)


b)


c)


d)


55. Consider the op-amp circuit shown below



Output voltage V_{out}, with $V_1=V_2=V_3=V_4=1$ volts is

a) –3v
b) –3.16v
c) –4.16v
d) 4.16v

60. A voltage source with an internal resistance of R_2 powers a load resistance R_L Ohms; the dissipated power across R_L is P Watts. If R_L is halved, then dissipated power across the load is,

a) $\frac{P}{2}$

b) $< \frac{P}{2}$

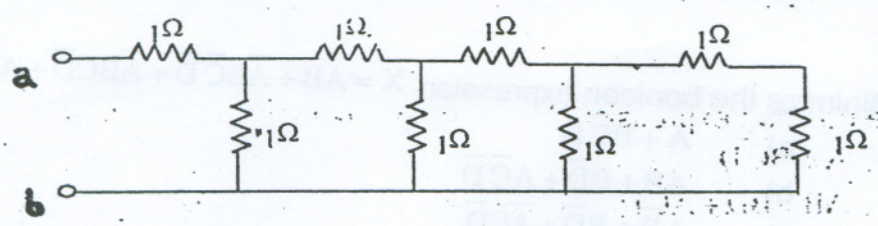
c) $> \frac{P}{2}$

d) 2P

61. Maximum bit rate supported by a channel with capacity C, with an SNR 15dB, bandwidth of 20KHz is

a) 160 Kbits/s
b) 40 Kbits/s
c) 80 Kbits/s
d) 100 Kbits/s

62. The resistance between points a and b in the following figure is



a) ∞
b) Zero
c) 1.5
d) 2.5

63. Frequency resolution of kth co-efficient of N point FFT of a signal sampled at rate f_s Hz is

a) $\left(\frac{k}{N}\right)^2 f_s$

b) $\frac{k}{N} f_s$

c) $\frac{k}{2N} f_s$

d) $\frac{2k}{N} f_s$

64. A signal is hard-limited to $[-B_H, -B_L]$ and $[B_L, B_H]$, $B_L>0$, $B_H>0$, and $B_H>B_L$. The minimum sampling rate for perfect reconstruction is,

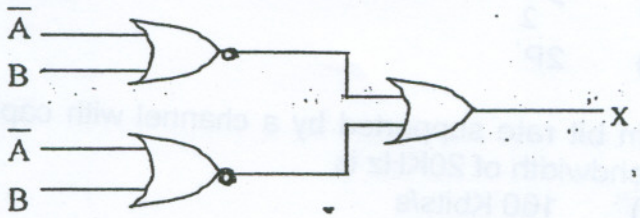
a) $\frac{B_H - B_L}{2}$

b) $2B_H$

c) $2B_L$

d) $2(B_H-B_L)$

65. What is the o/p of the following circuit?



a) $X = A\bar{B} + \bar{A}B$

b) $X = \bar{A}\,\bar{B} + \overline{\bar{A}\,\bar{B}}$

c) $X = \overline{\overline{\bar{A}\,\bar{B}} + A\bar{B}}$

d) $X = \overline{A\bar{B} + \bar{A}B}$

66. Minimize the boolean expression $X = AB + \bar{A}B\bar{C}\,\bar{D} + \bar{A}BC\bar{D} + A\overline{B\,C\,D}$

a) $A + B\bar{C}D$

b) $AB + B\bar{D} + A\bar{C}\bar{D}$

c) $A\bar{B} + B\bar{D} + \bar{A}C\bar{D}$

d) $\bar{A}BC + D\bar{B} + A\bar{C}D$

67. Which of the following logic families is fastest

a) TTL

b) ECL

c) I^2L

d) HTL

68. As wavelength increases gain of the antenna-

a) decreases

b) increases

c) remains same

d) no relation with

69. In what way skin-depth is related with frequency.
   a) Inversely proportional to $\sqrt{f}$
   b) Directly proportional to f^2
   c) Directly proportional to f
   d) No relation

70. Impedence inversion may be obtained with
   a) a short-circuited stub
   b) an open-circuited stub
   c) a quarter-wave line
   d) a half-wave line.

71. The ground wave eventually disappears, as one moves away from the transmitter, because of
   a) Interference from the sky wave
   b) Loss of LOS condition
   c) Maximum single-hop distance limitation
   d) Tilting.

72. If the number of bits used for coding is greater than the minimum number of bits required to be coded, then the following will happen
   a) Quantization noise will reduce & bandwidth will increase.
   b) Quantization noise will remain same & bandwidth, will increase
   c) Quantization noise will decrease & bandwidth will decrease
   d) Quantization noise & bandwidth will remain same.

73. What is the noise figure value for an ideal receiver?
   a) Unity
   b) Infinity
   c) Zero
   d) Greater than one.

74. The FM signal is passed through a frequency doubler, the modulation index
   a) undergoes no change
   b) becomes double
   c) becomes zero
   d) becomes half

75. GMSK stands for
   a) General modulation shift keying
   b) Gaussian minimum shift keying
   c) General minimum shift keying
   d) Gibbs modulation shift keying.

76. Which of the following modulation technique will have capture effect
   a) FM
   b) AM
   c) PM
   d) PAM

77. A speech signal is sampled at 8kHz and each sample is coded using 8 bits. What is the output bit rate-
   a) 8 Kbps
   b) 16 Kbps
   c) 32 Kbps
   d) 64 Kbps

78. Which of the following modulation technique is used to reduce slope-ove load nois
   ADPCM
   b) DPCM
   c) PCM
   d) Delta modulation

79. Generally used Modulation Scheme in Satellite communication is
   a) ASK
   b) QPSK
   c) FSK
   d) QAM

80. Traps are also called as
   a) Software Interrupts
   b) Maskable Interrupts
   c) Non-maskable Interrupts
   d) Internal Interrupts

81. Which of the following is not an inter process communication (IPC) mechanism
   a) Semaphores
   b) Pipes
   c) Shared memory
   d) Shared segment

82. While biasing JFET, the following bias is comparable with the emitter bias of a bipolar transistor
   a) Gate bias
   b) Self bias
   c) Source bias
   d) None of the above

83. A very large signal current gain through the direct coupling of two transistors can be obtained by
   a) Common base amplifier
   b) Common emitter amplifier
   c) Power amplifier
   d) Emitter follower

84. The mobile communication standard followed in India is
   a) IS-54
   b) GSM
   c) IS-95
   d) IS-136

85. The Fourier Transform of a Gaussian random variable is
   a) Gaussian
   b) Rician
   c) Rayleigh
   d) Log-normal

86. The Hilbert Transform of a sinusoidal signal can be obtained by
   a) 45° phase shifting
   b) 180° phase shifting
   c) 135° phase shifting
   d) 90° phase shifting

87. The power consumption in a CMOS processor is
   a) directly proportional to the clock frequency
   b) inversely proportional to the clock frequency
   c) not dependent on the clock frequency
   d) a function of power supply voltage only

88. The power spectrum and autocorrelation function of a wide-sense stationary random process are related by
   a) Paley-Wiener Theorem
   b) Wiener-Khintchin – Einstein Theorem
   c) Parseval's theorem
   d) Mason's formula

89. The eigen values of a positive semidefinite Hermitian matrix will be
   a) Complex
   b) Imaginary
   c) Real and negative
   d) Real and non-negative

90. Which of the following is correct?
   a) A wide-sense stationary random process is also a strict-sense stationary random process.
   b) A strict-sense stationary random process is also a wide-sense stationary random process.
   c) An ergodic random process is always a strict-sense stationary random process.
   d) None of the above.

91. A discrete time linear shift invariant system is said to be minimum phase if
   a) its poles lie inside the unit circle and zeros lie outside the unit circle in the Z- plane
   b) its poles lie outside the unit circle and zeros lie inside the unit circle in the Z-plane
   c) its poles and zeros lie inside the unit circle in the Z-plane.
   d) its poles and zeros lie outside the unit circle in the Z-plane.

92. Which of the following statements is true?
   a) A Discrete-Time sinusoidal sequence is always periodic
   b) A discrete-time sinusoidal sequence is always non-periodic
   c) A discrete-time sinusoidal sequence T_s is periodic if and only if Ts/T is rational where T is the fundamental period of continuous time sinusoidal signal
   d) None of the above

93. Which of the following types of filters is called maximally flat filter?
   a) Chebyshev filter
   b) Bessel filter
   c) Butterworth filter
   d) Elliptic filter

94. Which of the following functions is not Fourier transformable?

a) $x(t) = \sin(\omega t)/(\omega t)$
b) $x(t) = e^{-j\omega t}$
c) $x(t) =$ constant for all t
d) $x(t) = t\,u(t)$ where $u(t)$ is the unit step function

95. Which of the following is an eigen signal?

a) Sinusoidal signal
b) Step Signal
c) Triangular Signal
d) None of the above

96. The inverse Fourier transform of the $\frac{\sin(x)}{x}$ function is

a) $\frac{\sin(x)}{x}$
b) rect (x)
c) triangular function
d) exp (x) function

97. The aperture effect is caused due to

a) Inadequate sampling rate
b) Over sampling rate
c) Non-ideal sampling function
d) None of the above

98. WAP as applied to currently popular tetherless communication products is

a) Windows Application Program
b) Wireless Access Protocol
c) Wideband Amplitude Profile
d) None of the above

99. The image frequency of superheterodyne receiver tuned to 900 MHz and with a LO at 800 MHz is
    a) 100 MHz
    b) 700 MHz
    c) 600 MHz
    d) 1000 MHz

100. In a particular communication system an amplitude modulation with a single side band and suppressed carrier has been adopted. If the depth of modulation is 50% then the percentage power saving as compared to DSBFC AM system would be
    a) 60.5%
    b) 50%
    c) 83.3%
    d) 94.4%

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onventional household microwave ovens operate at approximately

a) 100 MHz
b) 1 GHz
c) 10 GHz
d) 2.4 GHz

A 10dB return loss measured on a microwave module corresponds approximately to a VSWR of

a) 2:1
b) 1.1:1
c) 10:1
d) infinity

3. Input reflection coefficient of a microwave circuit in terms two port scattering parameters is given by

a) S_{12}
b) S_{21}
c) S_{11}
d) None for the above

4. A signal generator is tuned to a frequency of 1 GHz and is generating a power of 1 milli watt. The largest spurious signal level measured was –40 dBc. The power of this spurious signal is thus.

a) 0.1 milli watt
b) 0.1 microwatt
c) 10 watts
d) 0.4 milliwatt

5. The power density at a distance 'r' from an isotropic source is

a) Directly proportional to the square of power radiated.
b) Inversely proportional to the power radiated and to the square of the distance 'r' from the point source.
c) Directly proportional to the power radiated and inversely proportional to the distance 'r' from the point source.
d) Directly proportional to the power radiated and inversely proportional to the square of the distance 'r' from the point source.

56. The unit step response of a linear system is, e^{-2t}. Then, the unit impulse response of the system is

a) $-2e^{-2t}$

b) $\frac{1}{2}e^{-2t}$

c) $2e^{-2t}$

d) $-\frac{1}{2}e^{-2t}$

57. Symbols A, B, C and D repeat with the probabilities given in the Following table:

Symbol	A	B	C	D
Probability	0.2	0.5	0.2	0.1

The Huffmann code of symbol D is

a) 00
b) 1
c) 010
d) 011

58. FSK transmission with $\beta = 0.5$ is desired, so that two carrier frequencies are taken to be 1.2KHz and 2.2KHz, over a telephone channel at 1200 bits/s. The base-band bandwidth required for binary signals is

a) 2.5KHz
b) 1.5KHz
c) 0.5KHz
d) 1KHz

59. Ten 10 KHz signal channels are sampled at a rate of 25 K Samples/s per channel. If each sample is coded into 6 bits, then the PCM o/p rate is

a) 10 Mbits/s
b) 1.5 Mbits/s
c) 150Kbits/s
d) 0.25 M bits/s